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Nov 28, 1995

PUB-NO: JP407309858A

DOCUMENT-IDENTIFIER: JP 07309858 A

TITLE: OPTICALLY ACTIVE COMPOUND, LIQUID CRYSTAL COMPOSITION CONTAINING THE SAME,
LIQUID CRYSTAL ELEMENT CONTAINING THE SAME AND DISPLAY DEVICE AND DISPLAYING METHOD
USING THE SAME ELEMENT

PUBN-DATE: November 28, 1995

INVENTOR-INFORMATION:

NAME

COUNTRY

NAKAMURA, SHINICHI

TAKIGUCHI, TAKAO

IWAKI, TAKASHI

TOKANOU, GOUJI

YAMADA, YOKO

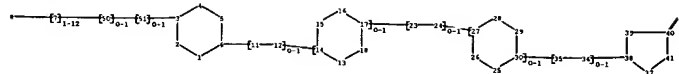
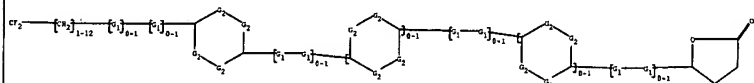
INT-CL (IPC): C07 D 307/33; C07 D 401/04; C07 D 405/06; C07 D 417/04; C07 D 417/12;
C07 D 417/14; C09 K 19/34; C09 K 19/54; G02 F 1/13

ABSTRACT:

PURPOSE: To obtain a new optically active compound useful for a ferroelectric chiral smectic liquid crystal element, etc., having high-speed responsiveness and contrast properties and reduced temperature dependence of response speed.

CONSTITUTION: A compound of formula I [R1 and R2 are each H, a halogen, CN, a 1-30C (nonadjoining CH2 substituted with O or S) alkyl; A3 is 1,4- phenylene or pyridine-2,5-diyl (mono- or disubstituted with F, Cl, Br, etc.), etc.; A1, A2 and A4 are each a single bond or A3; X1 is a single bond, COO, CH2O, CH2CH2, CH=CH, C≡C, etc.; X2 is OCH2, COOCH2 or a group of the formula (CH2)_p ((p) is 0-2); L is optically active butanolido3,4-diyl] such as 3-[4-(5-decylpyrimidin-2-yl)phenyloxymethyl]-4-propylbutanolide. The compound of formula I is obtained by reacting a compound of formula II (E1 is an eliminable group) with diethyl malonate to give a compound of formula III and reacting the compound with a compound of formula IV (E3 is an eliminable group).

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chain nodes :

7 8 11 12 23 24 35 36 42 50 51

ring nodes :

1 2 3 4 5 6 13 14 15 16 17 18 25 26 27 28 29 30 37 38 39 40 41

chain bonds :

3-51 6-11 7-8 7-50 11-12 12-14 17-23 23-24 24-27 30-35 35-36 36-38 40-42
50-51

ring bonds :

1-2 1-6 2-3 3-4 4-5 5-6 13-14 13-18 14-15 15-16 16-17 17-18 25-26 25-30
26-27 27-28 28-29 29-30 37-38 37-41 38-39 39-40 40-41

exact/norm bonds :

1-2 1-6 2-3 3-4 3-51 4-5 5-6 6-11 7-8 7-50 11-12 12-14 13-14 13-18 14-15
15-16 16-17 17-18 17-23 23-24 24-27 25-26 25-30 26-27 27-28 28-29 29-30 30-35
35-36 36-38 37-38 37-41 38-39 39-40 40-41 40-42 50-51

G1:C,O

G2:C,O,N

Match level :

1:Atom 2:Atom 3:Atom 4:Atom 5:Atom 6:Atom 7:CLASS 8:CLASS 11:CLASS 12:CLASS
13:Atom 14:Atom 15:Atom 16:Atom 17:Atom 18:Atom 23:CLASS 24:CLASS 25:Atom
26:Atom 27:Atom 28:Atom 29:Atom 30:Atom 35:CLASS 36:CLASS 37:Atom 38:Atom
39:Atom 40:Atom 41:Atom 42:CLASS 50:CLASS 51:CLASS

AN 1995:740928 CAPLUS
 DN 123:127788
 TI Mesomorphic compound, liquid crystal composition containing the compound, liquid crystal device using the composition, liquid crystal apparatus and display method.
 IN Shinichi, Nakamura; Takao, Takiguchi; Takashi, Iwaki; Takeshi, Togano; Yoko, Kosaka
 PA Canon K. K., Japan
 SO Eur. Pat. Appl., 84 pp.
 CODEN: EPXXDW
 DT Patent
 LA English
 IC ICM C09K019-34
 ICS C09K019-12; C09K019-14; C09K019-32; C09K019-20; C09K019-04; C09K019-46; C07D239-26; C07D213-30; C07D319-06; C07C069-76
 CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
 Section cross-reference(s): 75

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 640676	A1	19950301	EP 1994-113508	19940830
	EP 640676	B1	19990120		
	R: CH, DE, ES, FR, GB, IT, LI, NL, SE				
	JP 07097354	A2	19950411	JP 1993-237215	19930831
	JP 3230024	B2	20011119		
	JP 07133244	A2	19950523	JP 1993-243580	19930906
	JP 3216752	B2	20011009		
	US 5653913	A	19970805	US 1996-628446	19960405
PRAI	JP 1993-237215	A	19930831		
	JP 1993-243580	A	19930906		
	US 1994-297840	B1	19940830		

OS MARPAT 123:127788

AB A mesomorphic compd. CmH_{2m+10}(CH₂)_n(CH₂)_p(CH₂)_q-Y1-A1-R1 [R1 = H, halogen, CN, or a linear, branched or cyclized alkyl group having 1-30 C atoms capable of including at least one -CH₂- group which can be replaced with -O-, -S-, -CO-, -CH(Cl)-, -CH(CN)-, -CCH₃(CN)-, -CH:CH- or -C.tplbond.C- provided that heteroatoms are not adjacent to each other and capable of including at least one H which can be replaced with F; m, n, p and q = 1-16 provided that m + n + p + q .ltoreq. 18; Y1 denotes a single bond, -O-, -CO-, -COO-, -OCO-, -CH:CH or -C.tplbond.C-; A1 = -A2-, -A2-X1-A3- or -A2-X1-A3-X2-A4 in which A2, A3 and A4 independently denote a divalent cyclic group; X1, X2 = a single bond, -COO-, -OCO-, -CH₂O-, -OCH₂-, -CH₂CH₂-, -CH:CH- or -C.tplbond.C-] having .gtoreq.2 ether groups between alkylene groups in a specific alkoxy perfluoroalkyl terminal group is suitable as a component for a liq. crystal compn. providing improved response characteristics and a high contrast. A liq. crystal device is constituted by disposing the liq. crystal compn. between a pair of substrates. The liq. crystal device is used as a display panel constituting a liq. crystal app. providing good display characteristics.
 ST mesomorphic liq crystal device display; perfluoroalkyl mesomorphic compd
 IT Liquid crystals

(perfluoroalkyl mesomorphic compd.)

IT Optical imaging devices

(electrooptical liq.-crystal, perfluoroalkyl mesomorphic compd.)

IT	166439-30-1	166439-31-2	166439-32-3	166439-33-4	166439-34-5
	166439-35-6	166439-36-7	166439-37-8	166439-38-9	166439-39-0
	166439-40-3	166439-41-4	166439-42-5	166439-43-6	166439-44-7
	166439-45-8	166439-46-9	166439-47-0	166439-48-1	166439-49-2
	166439-50-5	166439-51-6	166439-52-7	166439-53-8	166439-54-9
	166439-55-0	166439-56-1	166439-57-2	166439-58-3	166439-59-4
	166439-60-7	166439-61-8	166439-62-9	166439-63-0	166439-64-1
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	166439-70-9	166439-71-0	166439-72-1	166439-73-2	166439-74-3

166439-75-4 166439-76-5 166439-77-6 166439-78-7 166439-79-8
 166439-80-1 166439-81-2 166439-82-3 166439-83-4 166439-84-5
 166439-85-6 166439-86-7 166439-87-8 166439-88-9 166439-89-0
 166439-90-3 166439-91-4 166439-92-5 166439-93-6 166439-94-7
 166439-95-8 166439-96-9 166439-97-0

RL: MOA (Modifier or additive use); USES (Uses)

(perfluoroalkyl mesomorphic compd. for liq. crystal compn.)

IT 166398-09-0P 166439-21-0P 166439-22-1P 166439-23-2P 166439-24-3P
 166439-25-4P 166439-26-5P 166439-27-6P 166439-28-7P 166439-29-8P

RL: MOA (Modifier or additive use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)

(perfluoroalkyl mesomorphic compd. for liq. crystal compn.)

IT 166397-72-4P 166439-98-1P 166439-99-2P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(perfluoroalkyl mesomorphic compd. for liq. crystal compn.)

IT 166439-69-6 166439-74-3

RL: MOA (Modifier or additive use); USES (Uses)

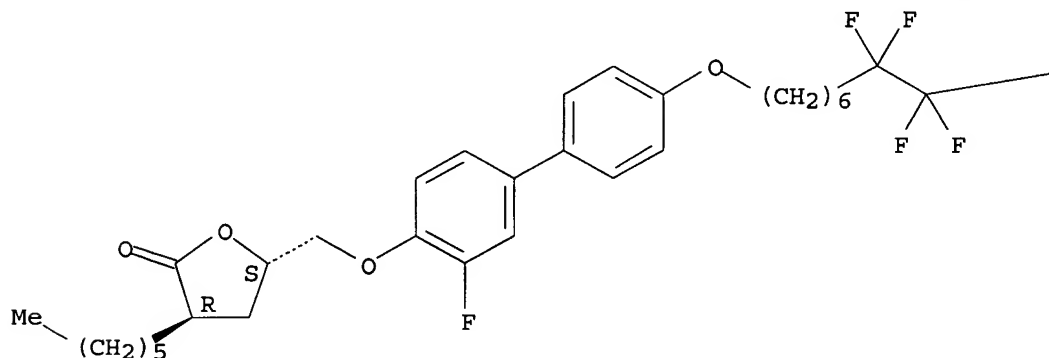
(perfluoroalkyl mesomorphic compd. for liq. crystal compn.)

RN 166439-69-6 CAPLUS

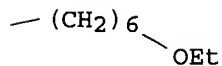
CN erythro-Pentonic acid, 2,3-dideoxy-5-O-[4'-[(14-ethoxy-7,7,8,8-tetrafluorotetradecyl)oxy]-3-fluoro[1,1'-biphenyl]-4-yl]-2-hexyl-, .gamma.-lactone (9CI) (CA INDEX NAME)

Relative stereochemistry.

PAGE 1-A



PAGE 1-B

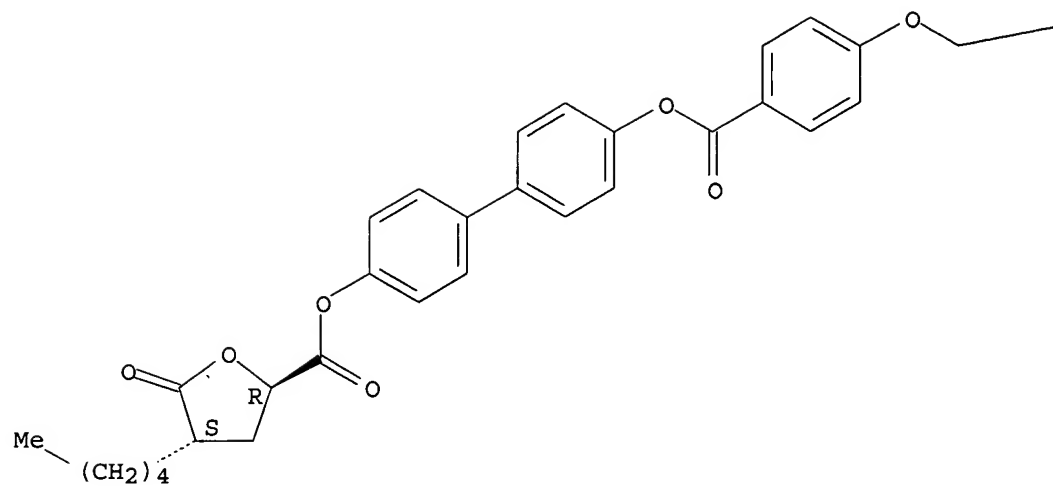


RN 166439-74-3 CAPLUS

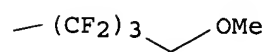
CN 2-Furancarboxylic acid, tetrahydro-5-oxo-4-pentyl-, 4'-[[4-[(2,2,3,3,4,4-hexafluoro-5-methoxypentyl)oxy]benzoyl]oxy][1,1'-biphenyl]-4-yl ester, trans- (9CI) (CA INDEX NAME)

Relative stereochemistry.

PAGE 1-A



PAGE 1-B



AN 1995:886137 CAPLUS
 DN 123:301639
 TI Chiral liquid crystal compounds having a perfluoro ether terminal portion
 IN Janulis, Eugene P.; Johnson, Gilbert C.; Radcliffe, Marc D.; Savu, Patricia M.; Snustad, Daniel C.; Spawn, Terence D.
 PA Minnesota Mining and Mfg. Co., USA
 SO PCT Int. Appl., 63 pp.
 CODEN: PIXXD2
 DT Patent
 LA English
 IC ICM C09K019-04
 ICS C09K019-12; C09K019-20; C09K019-34; C09K019-32; C09K019-44;
 C07C069-76; C07C043-225; C07D239-26
 CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
 Section cross-reference(s): 25, 75

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9517481	A1	19950629	WO 1994-US13250	19941116
	W: AU, CA, FI, JP, KR				
	RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	CA 2177590	AA	19950629	CA 1994-2177590	19941116
	AU 9511805	A1	19950710	AU 1995-11805	19941116
	AU 690944	B2	19980507		
	EP 736078	A1	19961009	EP 1995-902584	19941116
	EP 736078	B1	19980624		
	R: BE, CH, DE, ES, FR, GB, IT, LI, NL, SE				
	JP 09507059	T2	19970715	JP 1994-517413	19941116
	ES 2117847	T3	19980816	ES 1995-902584	19941116
	FI 9602535	A	19960618	FI 1996-2535	19960618
PRAI	US 1993-171569		19931222		
	WO 1994-US13250		19941116		
OS	MARPAT 123:301639				
AB	A F-contg., chiral liq. crystal compds. comprise: (a) an aliph. fluorocarbon terminal portion contg. .gtoreq.2 catenary ether O atoms; (b) a chiral, aliph. hydrocarbon terminal portion; and (c) a central core connecting the terminal portions. The compds. have smectic mesophases or latent smectic mesophases and are useful, for example, in liq. crystal display devices.				
ST	chiral liq crystal display perfluoro ether				
IT	Optical imaging devices (electrooptical liq.-crystal, Chiral liq. crystal compds. having a perfluoro ether terminal portion)				
IT	140401-07-6P	152914-74-4P	152914-80-2P	152914-95-9P	169505-19-5P
	169505-20-8P	169505-21-9P	169505-22-0P	169505-23-1P	169505-24-2P
	RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent) (Chiral liq. crystal compds. having a perfluoro ether terminal portion)				
IT	169505-25-3P	169505-26-4P	169505-27-5P	169505-28-6P	169505-29-7P
	169505-30-0P	169505-31-1P	169505-32-2P	169505-33-3P	169505-34-4P
	169505-35-5P	169505-36-6P	169505-37-7P	169505-38-8P	169505-39-9P
	169505-40-2P RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (Chiral liq. crystal compds. having a perfluoro ether terminal portion)				
IT	169505-42-4 RL: DEV (Device component use); USES (Uses) (chiral liq.-crystal compn.)				
IT	169505-48-0P 169505-49-1P RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent) (chiral liq.-crystal compn.)				
IT	169505-43-5P 169505-44-6P 169505-45-7P				

169505-46-8P 169505-47-9P

RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(chiral liq.-crystal compn.)

IT 169505-44-6P 169505-45-7P 169505-46-8P
169505-47-9P

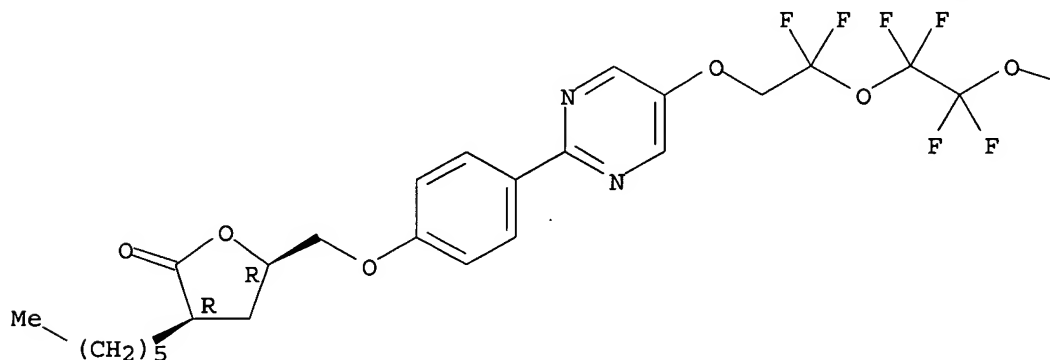
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(chiral liq.-crystal compn.)

RN 169505-44-6 CAPLUS

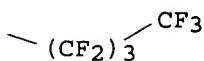
CN L-threo-Pentonic acid, 2,3-dideoxy-5-O-[4-[5-[2,2-difluoro-2-[1,1,2,2-tetrafluoro-2-(nonafluorobutoxy)ethoxy]ethoxy]-2-pyrimidinyl]phenyl]-2-hexyl-, .gamma.-lactone (9CI) (CA INDEX NAME)

Absolute stereochemistry.

PAGE 1-A



PAGE 1-B

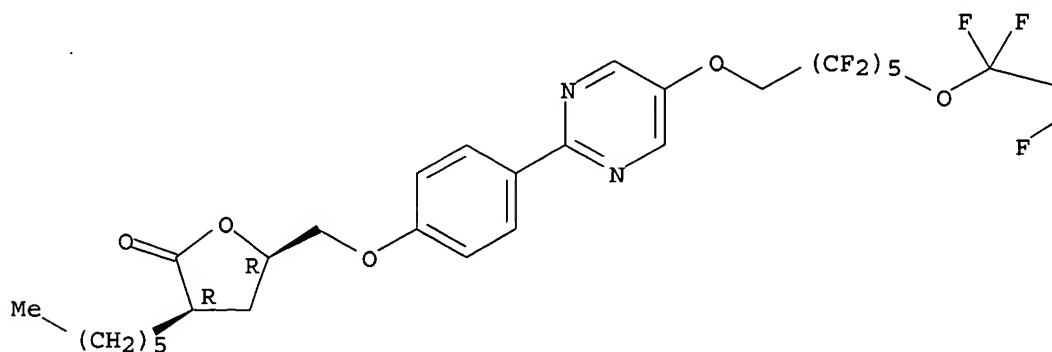


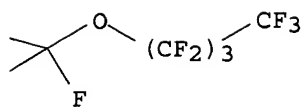
RN 169505-45-7 CAPLUS

CN L-threo-Pentonic acid, 5-O-[4-[5-[2,2,3,3,4,4,5,5,6,6-decafluoro-6-[1,1,2,2-tetrafluoro-2-(nonafluorobutoxy)ethoxy]hexyl]oxy]-2-pyrimidinyl]phenyl]-2,3-dideoxy-2-hexyl-, .gamma.-lactone (9CI) (CA INDEX NAME)

Absolute stereochemistry.

PAGE 1-A

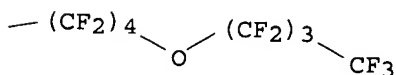
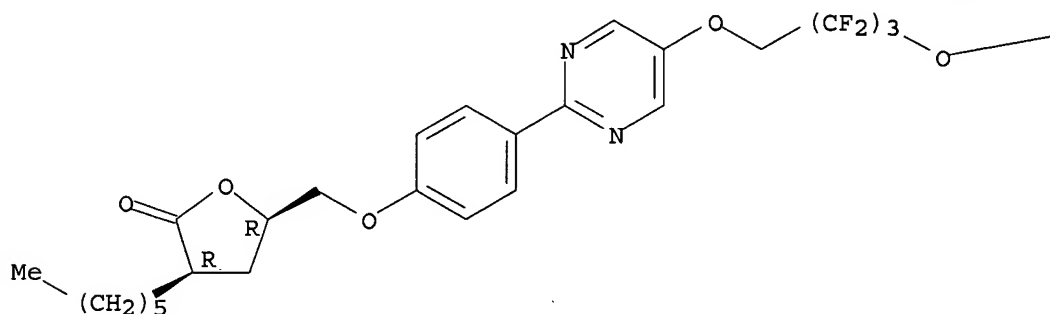




RN 169505-46-8 CAPLUS

CN L-threo-Pentonic acid, 2,3-dideoxy-5-O-[4-[5-[2,2,3,3,4,4-hexafluoro-4-[1,1,2,2,3,3,4,4-octafluoro-4-(nonafluorobutoxy)butoxy]butoxy]-2-pyrimidinyl]phenyl]-2-hexyl-, .gamma.-lactone (9CI) (CA INDEX NAME)

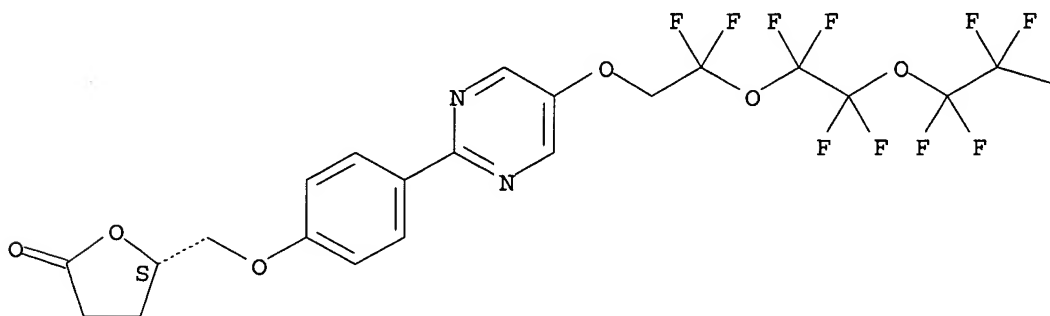
Absolute stereochemistry.



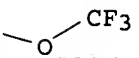
RN 169505-47-9 CAPLUS

CN 2(3H)-Furanone, 5-[4-[5-[2,2-difluoro-2-[1,1,2,2-tetrafluoro-2-[1,1,2,2-tetrafluoro-2-(trifluoromethoxy)ethoxy]ethoxy]ethoxy]-2-pyrimidinyl]phenoxy]methyl]dihydro-, (S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.



PAGE 1-B



AN 1996:126631 CAPLUS
 DN 124:302701
 TI Optically active compound, liquid crystal composition containing it, ferroelectric liquid crystal device with fast response time using the composition, display method and display apparatus
 IN Nakamura, Shinichi; Takiguchi, Takao; Iwaki, Takashi; Tokano, Goji; Yamada, Yoko
 PA Canon Kk, Japan
 SO Jpn. Kokai Tokkyo Koho, 37 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM C07D307-33
 ICS C07D401-04; C07D405-06; C07D417-04; C07D417-12; C07D417-14; C09K019-34; C09K019-54
 ICA G02F001-13
 CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
 Section cross-reference(s): 75
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 07309858	A2	19951128	JP 1994-124717	19940516
PRAI	JP 1994-124717		19940516		
AB	The title compn. comprises 1-80 % of the title optically active compd., R1A1A2X1A3X2LA4R2 [R1, R2 = H, halo, CN, C1-30 alkyl; A3 = 1,4-phenylene, pyridine-2,5-diyl, pyrimidine-2,5-diyl, etc.; A1, A2, A4 = single bond, A3; X1 = single bond, COO, OCO, CH2O, OCH2, CH2CH2, CH:CH, C.tplbond.C; X2 = OCH2, COOCH2, (CH2)p; p = 0-12; L = optically active butanolide-3,4-diyl].				
ST	liq crystal display chiral smectic				
IT	Liquid crystals (chiral smectic, optically active compd., liq. crystal compn. contg. it, ferroelec. liq. crystal device with fast response time using the compn., display method and display app.)				
IT	Optical imaging devices (electrooptical liq.-crystal, optically active compd., liq. crystal compn. contg. it, ferroelec. liq. crystal device with fast response time using the compn., display method and display app.)				
IT	Shutters (liq.-crystal, optically active compd., liq. crystal compn. contg. it, ferroelec. liq. crystal device with fast response time using the compn., display method and display app.)				
IT	57202-40-1	57202-48-9	57202-51-4	57202-62-7	74438-86-1
	95049-48-2	99895-85-9	108177-36-2	108572-55-0	110500-44-2
	114833-46-4	116529-05-6	117392-58-2	117503-17-0	117503-41-0
	119800-11-2	121083-94-1	121083-95-2	121639-87-0	121639-88-1
	121639-89-2	121639-94-9	121639-95-0	122317-95-7	122680-95-9
	122893-56-5	126397-59-9	127162-41-8	127345-39-5	127484-71-3
	127756-10-9	129470-93-5	134199-99-8	138955-11-0	138955-12-1
	138955-13-2	138955-14-3	138955-17-6	138955-18-7	138955-19-8
	138955-20-1	138955-21-2	138955-23-4	138955-24-5	138955-25-6
	138981-82-5	138981-83-6	139675-26-6	162084-01-7	162084-02-8
	162084-03-9	170992-22-0	170992-23-1	170992-26-4	173784-14-0
	173784-15-1	173784-16-2	173784-17-3		
	RL: DEV (Device component use); USES (Uses) (liq. crystal compn. for liq. crystal device)				
IT	173783-76-1	173783-77-2	173783-78-3	173783-80-7	173783-81-8
	173783-82-9	173783-83-0	173783-84-1	173783-85-2	173783-86-3
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	173783-92-1	173783-93-2	173783-94-3	173783-95-4	173783-96-5
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173784-12-8 173784-13-9
 RL: DEV (Device component use); USES (Uses)
 (optically active compd. for liq. crystal display)

IT 173783-79-4P 173784-11-7P
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP
 (Preparation); USES (Uses)
 (optically active compd. for liq. crystal display)

IT 105-53-3, Diethyl malonate 603-35-0, Triphenylphosphine, reactions
 865-47-4 1972-28-7, Diethyl azodicarboxylate 89321-71-1 102408-54-8,
 4-(5-Decylpyrimidin-2-yl)phenol 115770-82-6, Phenol,
 4-[5-(nonyloxy)-2-pyrimidinyl]-
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (prepn. of optically active compd. for liq. crystal display)

IT 173783-74-9P 173783-75-0P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT
 (Reactant or reagent)
 (prepn. of optically active compd. for liq. crystal display)

IT 173784-07-1
 RL: DEV (Device component use); USES (Uses)
 (optically active compd. for liq. crystal display)

RN 173784-07-1 CAPLUS

CN Benzoic acid, 4-[(2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-
 nonadecafluorodecyl)oxy]-, 4-[(3-butyltetrahydro-5-oxo-2-
 furanyl)methoxy]phenyl ester (9CI) (CA INDEX NAME)

